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SSSSSSSSSSSSSS 000000000 RRRRRRRRRRRR TTTTTTTTTTTTTTTT 333333333 222222222
SSSSSSSSSSSSSS 000000000 RRRRRRRRRRRR TTTTTTTTTTTTTTTT 333333333 222222222
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SSSSSSSSSSSS 000000000 RRR RRR TTT 333333333 2222222222222222
SSSSSSSSSSSS 000000000 RRR RRR TTT 333333333 2222222222222222
SSSSSSSSSSSS 000000000 RRR RRR TTT 333333333 2222222222222222
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VAX-11 Bliss-32 V4.0-742
_S255\$DUA28:[SORT32.SRC]OPCODES.REQ;1 Page 1 (1)

File: OPCODES.REQ IDENT = 'V04-000' ! File: OPCODES.REQ Edit: PDG1001

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*****
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FACILITY: VAX-11 SORT / MERGE

ABSTRACT:

This module defines numeric values of opcodes and operand specifiers.

ENVIRONMENT: VAX/VMS user mode

AUTHOR: P. Gilbert, CREATION DATE: 07-Dec-1981

MODIFIED BY:

V01-000 Original
V01-001 Change values of two-byte opcodes to conform with definitions
in STARLET. PDG 4-Apr-1983

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[illegible]

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VAX-11 Bliss-32 V4.0-742
_S255\$DUA28:[SORT32.SRC]OPCODES.REQ;1 Page 3
(2)

0102	0	'EDITPC'	4	'38'	rw,ab,ab,ab,	.	.
0103	00	'MATCHC'	4	'39'	rw,ab,rw,ab,	.	.
0104	00	'LOCC'	W	'3A'	rb,rw,ab,	.	.
0105	00	'SKPC'	W	'3B'	rb,rw,ab,	.	.
0106	00	'MOVZWL'	W	'3C'	rw,wl,	.	.
0107	00	'ACBW'	4	'3D'	rw,rw,mw,bw,	.	.
0108	00	'MOVAV'	2	'3E'	aw,wl,	.	.
0109	00	'PUSHAW'	1	'3F'	aw,	.	.
0110	00	'ADDF2'	W	'40'	rf,mf,	.	.
0111	00	'ADDF3'	W	'41'	rf,rf,wf,	.	.
0112	00	'SUBF2'	W	'42'	rf,mf,	.	.
0113	00	'SUBF3'	W	'43'	rf,rf,wf,	.	.
0114	00	'MULF2'	W	'44'	rf,mf,wf,	.	.
0115	00	'MULF3'	W	'45'	rf,rf,wf,	.	.
0116	00	'DIVF2'	W	'46'	rf,mf,	.	.
0117	00	'DIVF3'	W	'47'	rf,rf,wf,	.	.
0118	00	'CVTFB'	W	'48'	rf,wb,	.	.
0119	00	'CVTFW'	W	'49'	rf,ww,	.	.
0120	00	'CVTFL'	W	'4A'	rf,wl,	.	.
0121	00	'CVTRFL'	W	'4B'	rf,wl,	.	.
0122	00	'CVTBF'	W	'4C'	rb,wf,	.	.
0123	00	'CVTWF'	W	'4D'	rw,wf,	.	.
0124	00	'CVTLF'	W	'4E'	rl,wf,	.	.
0125	00	'ACBF'	4	'4F'	rf,rf,mf,bw,	.	.
0126	00	'MOVF'	W	'50'	rf,wf,	.	.
0127	00	'CMPF'	W	'51'	rf,rf,	.	.
0128	00	'MNEGF'	W	'52'	rf,wf,	.	.
0129	00	'TSTF'	1	'53'	rf,	.	.
0130	00	'EMODF'	5	'54'	rf,rb,rf,wl,wf,	.	.
0131	00	'POLYF'	W	'55'	rf,rw,ab,	.	.
0132	00	'CVTFD'	W	'56'	rf,wd,	.	.
0133	00	'X57'	0	'57'	.	.	.
0134	00	'ADAWI'	W	'58'	rw,mw,	.	.
0135	00	'X59'	0	'59'	.	.	.
0136	00	'X5A'	0	'5A'	.	.	.
0137	00	'X5B'	0	'5B'	.	.	.
0138	00	'INSQHI'	W	'5C'	ab,aq,	.	.
0139	00	'INSQTI'	W	'5D'	ab,aq,	.	.
0140	00	'REMQHI'	W	'5E'	aq,wl,	.	.
0141	00	'REMQTI'	W	'5F'	aq,wl,	.	.
0142	00	'ADDD2'	W	'60'	rd,md,	.	.
0143	00	'ADDD3'	W	'61'	rd,rd,wd,	.	.
0144	00	'SUBD2'	W	'62'	rd,md,wd,	.	.
0145	00	'SUBD3'	W	'63'	rd,rd,wd,	.	.
0146	00	'MULD2'	W	'64'	rd,md,wd,	.	.
0147	00	'MULD3'	W	'65'	rd,rd,wd,	.	.
0148	00	'DIVD2'	W	'66'	rd,md,wd,	.	.
0149	00	'DIVD3'	W	'67'	rd,rd,wd,	.	.
0150	00	'CVTDB'	W	'68'	rd,wb,	.	.
0151	00	'CVTDW'	W	'69'	rd,ww,	.	.
0152	00	'CVTDL'	W	'6A'	rd,wl,	.	.
0153	00	'CVTRDL'	W	'6B'	rd,wl,	.	.
0154	00	'CVTBD'	W	'6C'	rb,wd,	.	.
0155	00	'CVTWD'	W	'6D'	rw,wd,	.	.
0156	00	'CVTLD'	W	'6E'	rl,wd,	.	.
0157	00	'ACBD'	4	'6F'	rd,rd,md,bw,	.	.
0158	0	'MOVD'	2	'70'	rd,wd,	.	.

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(2)

0159	0	'CMPD'	2	'71'	rd,rd,				
0160	00	'MNEGD'	2	'72'	rd,wd,				
0161	00	'TSTD'	2	'73'	rd,				
0162	00	'EMODD'	3	'74'	rd,rb,rd,wd,				
0163	00	'POLYD'	3	'75'	rd,rw,ab,				
0164	00	'CVTDF'	3	'76'	rd,wf,				
0165	00	'X77'	3	'77'					
0166	00	'ASHL'	3	'78'	rb,rl,wd,				
0167	00	'ASHQ'	3	'79'	rb,rq,wq,				
0168	00	'EMUL'	4	'7A'	rl,rl,rl,wq,				
0169	00	'EDIV'	4	'7B'	rl,rq,wd,wd,				
0170	00	'CLRQ'	1	'7C'	wq,				
0171	00	'MOVQ'	2	'7D'	rq,wq,				
0172	00	'MOVAQ'	2	'7E'	aq,wd,				
0173	00	'PUSHAQ'	1	'7F'	aq,				
0174	00	'ADDB2'	2	'80'	rb,mb,				
0175	00	'ADDB3'	2	'81'	rb,rb,wb,				
0176	00	'SUBB2'	2	'82'	rb,mb,				
0177	00	'SUBB3'	2	'83'	rb,rb,wb,				
0178	00	'MULB2'	2	'84'	rb,mb,				
0179	00	'MULB3'	2	'85'	rb,rb,wb,				
0180	00	'DIVB2'	2	'86'	rb,mb,				
0181	00	'DIVB3'	2	'87'	rb,rb,wb,				
0182	00	'BISB2'	2	'88'	rb,mb,				
0183	00	'BISB3'	2	'89'	rb,rb,wb,				
0184	00	'BICB2'	2	'8A'	rb,mb,				
0185	00	'BICB3'	2	'8B'	rb,rb,wb,				
0186	00	'XORB2'	2	'8C'	rb,mb,				
0187	00	'XORB3'	2	'8D'	rb,rb,wb,				
0188	00	'MNEGB'	2	'8E'	rb,wb,				
0189	00	'CASEB'	2	'8F'	rb,rb,rb,				
0190	00	'MOVB'	2	'90'	rb,wb,				
0191	00	'CMPB'	2	'91'	rb,rb,				
0192	00	'MCOMB'	2	'92'	rb,wb,				
0193	00	'BITB'	2	'93'	rb,rb,				
0194	00	'CLRB'	1	'94'	wb,				
0195	00	'TSTB'	1	'95'	rb,				
0196	00	'INCB'	1	'96'	mb,				
0197	00	'DECB'	1	'97'	mb,				
0198	00	'CVTBL'	2	'98'	rb,wd,				
0199	00	'CVTBW'	2	'99'	rb,ww,				
0200	00	'MOVZBL'	2	'9A'	rb,wd,				
0201	00	'MOVZBW'	2	'9B'	rb,ww,				
0202	00	'ROTL'	3	'9C'	rb,rl,wd,				
0203	00	'ACBB'	4	'9D'	rb,rb,mb,bw,				
0204	00	'MOVAB'	2	'9E'	ab,wd,				
0205	00	'PUSHAB'	1	'9F'	ab,				
0206	00	'ADDW2'	2	'A0'	rw,mw,				
0207	00	'ADDW3'	2	'A1'	rw,rw,ww,				
0208	00	'SUBW2'	2	'A2'	rw,mw,				
0209	00	'SUBW3'	2	'A3'	rw,rw,ww,				
0210	00	'MULW2'	2	'A4'	rw,mw,				
0211	00	'MULW3'	2	'A5'	rw,rw,ww,				
0212	00	'DIVW2'	2	'A6'	rw,mw,				
0213	00	'DIVW3'	2	'A7'	rw,rw,ww,				
0214	00	'BISW2'	2	'A8'	rw,mw,				
0215	00	'BISW3'	2	'A9'	rw,rw,ww,				

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(2)

0216	'BICW2'	2	'AA'	rw,mw			
0217	'BICW3'	2	'AB'	rw,rw,ww			
0218	'XORW2'	2	'AC'	rw,mw			
0219	'XORW3'	2	'AD'	rw,rw,ww			
0220	'MNEGW'	2	'AE'	rw,ww			
0221	'CASEW'	2	'AF'	rw,rw,rw			
0222	'MOVW'	2	'B0'	rw,ww			
0223	'CMPW'	2	'B1'	rw,ww			
0224	'MCOMW'	2	'B2'	rw,ww			
0225	'BITW'	2	'B3'	rw,rw			
0226	'CLRW'	1	'B4'	ww			
0227	'TSTW'	1	'B5'	rw			
0228	'INCW'	1	'B6'	mw			
0229	'DECW'	1	'B7'	mw			
0230	'BISPSW'	1	'B8'	rw			
0231	'BICPSW'	1	'B9'	rw			
0232	'POPR'	1	'BA'	rw			
0233	'PUSHR'	1	'BB'	rw			
0234	'CHMK'	1	'BC'	rw			
0235	'CHME'	1	'BD'	rw			
0236	'CHMS'	1	'BE'	rw			
0237	'CHMU'	1	'BF'	rw			
0238	'ADDL2'	2	'C0'	rl,m			
0239	'ADDL3'	2	'C1'	rl,m,wl			
0240	'SUBL2'	2	'C2'	rl,m,wl			
0241	'SUBL3'	2	'C3'	rl,m,wl			
0242	'MULL2'	2	'C4'	rl,m,wl			
0243	'MULL3'	2	'C5'	rl,m,wl			
0244	'DIVL2'	2	'C6'	rl,m,wl			
0245	'DIVL3'	2	'C7'	rl,m,wl			
0246	'BISL2'	2	'C8'	rl,m,wl			
0247	'BISL3'	2	'C9'	rl,m,wl			
0248	'BICL2'	2	'CA'	rl,m,wl			
0249	'BICL3'	2	'CB'	rl,m,wl			
0250	'XORL2'	2	'CC'	rl,m,wl			
0251	'XORL3'	2	'CD'	rl,m,wl			
0252	'MNEGL'	2	'CE'	rl,m,rl			
0253	'CASEL'	2	'CF'	rl,m,rl			
0254	'MOVL'	2	'D0'	rl,m,wl			
0255	'CMPL'	2	'D1'	rl,m,wl			
0256	'MCOML'	2	'D2'	rl,m,wl			
0257	'BITL'	2	'D3'	rl,m			
0258	'CLRL'	1	'D4'	wl			
0259	'TSTL'	1	'D5'	rl			
0260	'INCL'	1	'D6'	ml			
0261	'DECL'	1	'D7'	ml			
0262	'ADWC'	2	'D8'	rl,m			
0263	'SBWC'	2	'D9'	rl,m			
0264	'MTPR'	2	'DA'	rl,rl			
0265	'MFPR'	2	'DB'	rl,rl			
0266	'MOVPSL'	1	'DC'	wl			
0267	'PUSHL'	1	'DD'	rl			
0268	'MOVAL'	2	'DE'	al,wl			
0269	'PUSHAL'	1	'DF'	al			
0270	'BBS'	3	'E0'	rl,vb,bb			
0271	'BBC'	3	'E1'	rl,vb,bb			
0272	'BBSS'	3	'E2'	rl,ub,bb			

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(2)

0273	0	'BBCS'	.	3	'FF3'	rl,ub,bb,	.	.	.
0274	000	'BBSC'	.	3	'FF4'	rl,ub,bb,	.	.	.
0275	000000	'BBCC'	.	3	'FF5'	rl,ub,bb,	.	.	.
0276	000000	'BBSSI'	.	3	'FF6'	rl,vb,bb,	.	.	.
0277	000000	'BBCCI'	.	3	'FF7'	rl,vb,bb,	.	.	.
0278	000000	'BLBS'	.	2	'FF8'	rl,bb,	.	.	.
0279	000000	'BLBC'	.	2	'FF9'	rl,bb,	.	.	.
0280	000000	'FFS'	.	4	'FFA'	rl,rb,vb,wl,	.	.	.
0281	000000	'FFC'	.	4	'FFB'	rl,rb,vb,wl,	.	.	.
0282	000000	'CMPV'	.	4	'FFC'	rl,rb,vb,rl,	.	.	.
0283	000000	'CMPZV'	.	4	'FFD'	rl,rb,vb,rl,	.	.	.
0284	000000	'EXTV'	.	4	'FFE'	rl,rb,vb,wl,	.	.	.
0285	000000	'EXTZV'	.	4	'FFF'	rl,rb,vb,wl,	.	.	.
0286	000000	'INSV'	.	4	'F0'	rl,rl,rb,ub,	.	.	.
0287	000000	'ACBL'	.	4	'F1'	rl,rl,ml,bw,	.	.	.
0288	000000	'AOBLSS'	.	3	'F2'	rl,ml,bb,	.	.	.
0289	000000	'AOBLEQ'	.	3	'F3'	rl,ml,bb,	.	.	.
0290	000000	'SOBGEG'	.	3	'F4'	ml,bb,	.	.	.
0291	000000	'SOBGTR'	.	3	'F5'	ml,bb,	.	.	.
0292	000000	'CVTLB'	.	2	'F6'	rl,wb,	.	.	.
0293	000000	'CVTLW'	.	2	'F7'	rl,ww,	.	.	.
0294	000000	'ASHP'	.	6	'F8'	rb,rw,ab,rb,rw,ab,	.	.	.
0295	000000	'CVTLP'	.	3	'F9'	rl,rw,ab,	.	.	.
0296	000000	'CALLG'	.	2	'FA'	ab,ab,	.	.	.
0297	000000	'CALLS'	.	2	'FB'	rl,ab,	.	.	.
0298	000000	'XFC'	.	0	'FC'	.	.	.	.
0299	000000	'ESCD'	.	0	'FD'	.	.	.	.
0300	0	'ESCE'	.	0	'FE'	.	.	.	.
0301	0	'ESCF'	.	0	'FF'	.	.	.	%;

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(3)

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MACRO FDCODES =
0302 'CVTDH' . . . . . '32FD' . . . rd,wh, . . .
0303 'CVTGF' . . . . . '33FD' . . . rg,wf, . . .
0304 'ADDG2' . . . . . '40FD' . . . rg,mg, . . .
0305 'ADDG3' . . . . . '41FD' . . . rg,rg,wg, . . .
0306 'SUBG2' . . . . . '42FD' . . . rg,mg, . . .
0307 'SUBG3' . . . . . '43FD' . . . rg,rg,wg, . . .
0308 'MULG2' . . . . . '44FD' . . . rg,mg, . . .
0309 'MULG3' . . . . . '45FD' . . . rg,rg,wg, . . .
0310 'DIVG2' . . . . . '46FD' . . . rg,mg, . . .
0311 'DIVG3' . . . . . '47FD' . . . rg,rg,wg, . . .
0312 'CVTGB' . . . . . '48FD' . . . rg,wb, . . .
0313 'CVIGW' . . . . . '49FD' . . . rg,ww, . . .
0314 'CVTGL' . . . . . '4AFD' . . . rg,wl, . . .
0315 'CVTRGL' . . . . . '4BFD' . . . rg,wl, . . .
0316 'CVTBG' . . . . . '4CFD' . . . rb,wg, . . .
0317 'CVTWG' . . . . . '4DFD' . . . rw,wg, . . .
0318 'CVTLG' . . . . . '4EFD' . . . rl,wg, . . .
0319 'ACBG' . . . . . '4FFD' . . . rg,rg,mg,bw, . . .
0320 'MOVG' . . . . . '50FD' . . . rg,wg, . . .
0321 'CMPG' . . . . . '51FD' . . . rg,rg, . . .
0322 'MNEGG' . . . . . '52FD' . . . rg,wg, . . .
0323 'TSTG' . . . . . '53FD' . . . rg, . . .
0324 'EMODG' . . . . . '54FD' . . . rg,rw,rg,wl,wg, . . .
0325 'POLYG' . . . . . '55FD' . . . rg,rw,ab, . . .
0326 'CVTGH' . . . . . '56FD' . . . rg,wh, . . .
0327 'ADDH2' . . . . . '60FD' . . . rh,mh, . . .
0328 'ADDH3' . . . . . '61FD' . . . rh,rh,wh, . . .
0329 'SUBH2' . . . . . '62FD' . . . rh,mh, . . .
0330 'SUBH3' . . . . . '63FD' . . . rh,rh,wh, . . .
0331 'MULH2' . . . . . '64FD' . . . rh,mh, . . .
0332 'MULH3' . . . . . '65FD' . . . rh,rh,wh, . . .
0333 'DIVH2' . . . . . '66FD' . . . rh,mh, . . .
0334 'DIVH3' . . . . . '67FD' . . . rh,rh,wh, . . .
0335 'CVTHB' . . . . . '68FD' . . . rh,rh, . . .
0336 'CVTHW' . . . . . '69FD' . . . rh,rh, . . .
0337 'CVTHL' . . . . . '6AFD' . . . rh,rh, . . .
0338 'CVTRHL' . . . . . '6BFD' . . . rh,rh, . . .
0339 'CVTBH' . . . . . '6CFD' . . . rb,wh, . . .
0340 'CVTWH' . . . . . '6DFD' . . . rw,wh, . . .
0341 'CVTLH' . . . . . '6EFD' . . . rl,wh, . . .
0342 'ACBH' . . . . . '6FFD' . . . rh,rh,mh,bw, . . .
0343 'MOVH' . . . . . '70FD' . . . rh,wh, . . .
0344 'CMPH' . . . . . '71FD' . . . rh,rh, . . .
0345 'MNEGH' . . . . . '72FD' . . . rh,wh, . . .
0346 'TSTH' . . . . . '73FD' . . . rh, . . .
0347 'EMODH' . . . . . '74FD' . . . rh,rw,rh,wl,wh, . . .
0348 'POLYH' . . . . . '75FD' . . . rh,rw,ab, . . .
0349 'CVTHG' . . . . . '76FD' . . . rh,wg, . . .
0350 'CLRO' . . . . . '7CFD' . . . wo, . . .
0351 'MOVO' . . . . . '7DFD' . . . ro,wo, . . .
0352 'MOVAO' . . . . . '7EFD' . . . ao,wl, . . .
0353 'PUSHAO' . . . . . '7FFD' . . . ao, . . .
0354 'CVTFH' . . . . . '98FD' . . . rf,wh, . . .
0355 'CVTFG' . . . . . '99FD' . . . rf,wg, . . .
0356 'CVTHF' . . . . . 'F6FD' . . . rh,wf, . . .
0357 'CVTHD' . . . . . 'F7FD' . . . rh,wd, . . .
0358
```

F 7
16-Sep-1984 00:21:13
15-Sep-1984 22:50:03

VAX-11 Bliss-32 V4.0-742
_S255\$DUA28:[SORT32.SRC]OPCODES.REQ;1 Page 8 (3)

: M 0359 0 'BUGL' ; 0; 'FDFD'; il; ; ; ; ;
: 0360 0 'BUGW' ; 0; 'FEFD'; iw; ; ; ; ;

SOF
VO4

G 7
16-Sep-1984 00:21:13
15-Sep-1984 22:50:03

VAX-11 Bliss-32 V4.0-742
_S255\$DUA28:[SORT32.SRC]OPCODES.REQ;1 Page 9 (4)

```
: 0361 0 MACRO
: M 0362 0 DEF_OPCODES[A,B,C,D,E,F,G,H,I] =
: 0363 0 %NAME('OPC_',A) = %X C %;
: 0364 0 LITERAL
: 0365 0 DEF_OPCODES(OPCODES,FDCODES);
: 0366 0
: 0367 0 UNDECLARE
: 0368 0 %QUOTE OPCODES,
: 0369 0 %QUOTE FDCODES;
```

H 7
16-Sep-1984 00:21:13
15-Sep-1984 22:50:03

VAX-11 Bliss-32 V4.0-742 Page 10
_S255\$DUA28:[SORT32.SRC]OPCODES.REQ;1 (5)

```
: 0370 0 ! Define literals for the registers
: 0371 0 !
: 0372 0 LITERAL
: 0373 0 R_0 = 0. ! Register 0
: 0374 0 R_1 = 1.
: 0375 0 R_2 = 2.
: 0376 0 R_3 = 3.
: 0377 0 R_4 = 4.
: 0378 0 R_5 = 5.
: 0379 0 R_6 = 6.
: 0380 0 R_7 = 7.
: 0381 0 R_8 = 8.
: 0382 0 R_9 = 9.
: 0383 0 R_10 = 10.
: 0384 0 R_11 = 11.
: 0385 0 R_AP = 12. ! Argument Pointer
: 0386 0 R_FP = 13. ! Frame pointer
: 0387 0 R_SP = 14. ! Stack pointer
: 0388 0 R_PC = 15. ! Program Counter
: 0389 0
: 0390 0 ! Define literals for addressing modes
: 0391 0 !
: 0392 0 LITERAL
: 0393 0 M_I = %X'40'. ! Indexed mode
: 0394 0 M_R = %X'50'. ! Register
: 0395 0 M_RD = %X'60'. ! Register deferred
: 0396 0 M_AD = %X'70'. ! Autodecrement
: 0397 0 M_AI = %X'80'. ! Autoincrement
: 0398 0 M_AID = %X'90'. ! Autoincrement deferred
: 0399 0 M_BD = %X'A0'. ! Byte displacement
: 0400 0 M_BDD = %X'B0'. ! Byte displacement deferred
: 0401 0 M_WD = %X'C0'. ! Word displacement
: 0402 0 M_WDD = %X'D0'. ! Word displacement deferred
: 0403 0 M_LD = %X'E0'. ! Longword displacement
: 0404 0 M_LDD = %X'F0'. ! Longword displacement deferred
```

COMMAND QUALIFIERS

```
: BLISS SRC$:OPCODES/LIS=LISS$:OPCODES/LIB=SRC$:OPCODES
: Run Time: 00:10.3
: Elapsed Time: 00:30.4
: Lines/CPU Min: 2348
: Lexemes/CPU-Min: 92494
: Memory Used: 216 pages
: Library Precompilation Complete
```


0363 AH-BT13A-SE
VAX/VMS V4.0

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